

1 INVENTION: Method and Apparatus for Creating Unique Image  
2 Passwords

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5 BACKGROUND OF INVENTION:

6 This invention is directed to the art of computer security.  
7 In recent years, security of computers has become significantly  
8 important, not only because of the proliferation of the use of  
9 computers, but also with the rise of interest in the Internet and  
10 potential access to individual computers from the Internet.  
11 Current and popular password schemes are often compromised due to  
12 an Internet hacker's knowledge that the characters making up the  
13 password are universal on every standard keyboard, since most  
14 keyboards utilize the common ASCII code.

15 The current invention is intended to take advantage of  
16 currently available graphic programs and utilize a keypad device  
17 with keypad and computer disc "keys" that allow for specific  
18 detailed graphical key images stored thereon that would be  
19 difficult, if not next to impossible, to recreate by typical trial  
20 and error.

21 The current invention utilizes color digital images, graphic  
22 images commonly available by design or by scanning in (such as  
23 utilizing a picture of one's own pet) that become passwords unique  
24 to the user. Paint programs and scanner programs that are readily  
25 available on nearly all computer platforms work compatibly with the  
26 instant invention to allow use of graphic image passwords.

27 The envisioned keypad device is comprised of an external  
28 numeric keypad, a display, a removable media device (for example

1 floppy disks or CD Rom's) that will have discs that act as "keys"  
2 having the graphic images thereon, and internal memory. The keypad  
3 device has non-volatile internal memory capable of storing the  
4 graphic image password once it is created by the user, and in fact  
5 in the preferred mode, the graphic user password is comprised of a  
6 series of images that are stored in the device with each image  
7 assigned to a key (0 through 9) on the device in a sequence  
8 specified by the user. This sequence is then replayed with the  
9 disk in place, to enable access to the computer. As a secondary  
10 security measure, the computer floppy drive or removable storage  
11 device will have placed therein its own floppy disk or CD Rom with  
12 a second graphic password (or non-image, if preferred) assigned to  
13 the computer keyboard, in a sequence fashioned much like the keypad  
14 device, such that the keypad device password and the computer  
15 password are necessary to gain access to the computer. These two  
16 passwords help prevent a would-be intruder otherwise placing his  
17 own keypad device that would otherwise send a "go" code to the  
18 computer.

19 Consequently, the user must have a disk having both passwords  
20 thereon (or two separate disks) with images that match the images  
21 stored in memory loaded in the media device each time the log-in  
22 attempt is tried or whenever the computer is powered up. In the  
23 alternative mode, the media device would also be able to be shared  
24 on a network through the input/output port.

25 The external keypad device will store both the images in  
26 password sequence and thus validate the sequence typed by the user  
27 attempting to gain access. In the preferred mode of the invention,  
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1           multiple failed accesses will disable the computer for a period of  
2           time.

3           The external keypad device is further designed to connect to  
4           a standard computer through the many different interfaces  
5           available, including serial, parallel, ethernet, keyboard ports,  
6           and USB ports.

7           Consequently it will be seen that what is shown is an ultra  
8           secure highly personalized password device and method that allows  
9           a user not only to have the user's own selected graphical keywords,  
10          but also allows the use of current graphical programs and utilizes  
11          the computer's current input/output ports, and further creates a  
12          highly secure apparatus and method.

13          Other objects and features of the invention and the manner in  
14          which the invention achieves its purpose will be appreciated from  
15          the foregoing and the following description and the accompanying  
16          drawings which exemplify the invention, it being understood that  
17          changes may be made in the specific method and apparatus disclosed  
18          herein without departing from the essentials of the invention set  
19          forth in the appended claims.

1           DESCRIPTION OF THE DRAWINGS:

2           Figure 1 is a shows the computer system and the keypad device.

3           Figure 2 is a block diagram of the keypad device connected to  
4           the block diagram of the computer system.

5           Figure 3 is a block diagram of the computer program modules  
6           for the invention.

7           Figure 4 is a flow chart for loading the respective image  
8           password.

9           Figure 5 is a block diagram of a flow chart for gaining access  
10          to the computer system through the keypad device utilizing the  
11          password and password sequence.

1           DESCRIPTION OF THE PREFERRED EMBODIMENT:

2           The apparatus is shown in Figure 1 in the preferred mode and  
3           in block diagram form in Figure 2. In Figure 1, the keypad device  
4           7 is shown in the preferred form adjacent to the computer keyboard  
5           5 although any particular placement is envisioned that allows easy  
6           access by the user. The term Keypad Device is used herein refers  
7           to the physically separate device shown in Figure 1. Keyboard as  
8           used herein refers to the computer keyboard 5.

9           The keyboard device 7 has display means 13 for displaying  
10          alphanumeric figures for prompting the user and for displaying  
11          status. Push button keys 15 are essentially the standard 0 - 9  
12          keys along with any desired extra keys that may be envisioned to  
13          carry out the program on the device. The keypad device also has  
14          floppy disk or other removable storage means 17. The floppy disk  
15          19 is shown, however, it should be understood that any removable  
16          storage device is envisioned including CD Rom.

17          The device is connected via cable 14 to the computer  
18          input/output ports. These can be any standard computer input/output  
19          ports including parallel, serial, ethernet or even standard USB  
20          ports. In the preferred mode, the standard USB port is envisioned.

21          The computer system is comprised of a standard PC, but can be  
22          any computer system having the block diagram content shown in  
23          Figure 2. The computer system is comprised of a monitor 3,  
24          computer with motherboard, input/output port, internal hard drive  
25          or other permanent storage means, with CD Rom 9 and/or floppy disk  
26          media device 11, and further has a typical keyboard 5 having

1           alphanumeric keys 23 and a numeric keypad 21. The keyboard is  
2           connected to the computer via cable 12. A mouse is also envisioned  
3           and is commonly used to construct any images in typical paint or  
4           other graphic display programs.

5           It should be understood that graphic display programs, include  
6           those programs commonly available on the market such as paint  
7           programs like MICROSOFT PAINT, COREL DRAW, ADOBE, and also includes  
8           scanner programs and the ability to scan in to the computer any  
9           images from a separate scanner device.

10          The block diagram shown in Figure 2 has two portions, the  
11         computer block diagram 51 and the keypad device block diagram 21.  
12         The keypad device 21 has input/output means 35, removable media  
13         device 39 (shown as 17 in Figure 1), keypad interface 23 (shown as  
14         15 in Figure 1), display means 25 (shown as 13 in Figure 1), all  
15         interfacing with the central processing unit 33. RAM memory 30 also  
16         interfaces with the processor as does non-volatile memory 28 (for  
17         receiving and permanently storing device image passwords). ROM  
18         memory 24 has therein the device program memory stored necessary to  
19         operate the keypad device. Permanent battery means 26 is  
20         electrically connected to the RAM memory to the extent the memory  
21         requires constant voltage. However, other non-volatile memory means  
22         are envisioned for 28 including magnetic cards or rewritable  
23         storage media.

24          The keyboard device is connected to the computer in Figure 2  
25         via cable 37 showing the connections between the respective  
26         input/output devices 35 and 59. The computer block diagram 51  
27         reflects a fairly standard computer block diagram having a CPU,  
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controlling the various parts including the permanent hard drive 57, display means 55, keyboard interface 53 and removable means device 61. The removable media device 61 can be any removable media device capable of storing the respective computer image password envisioned by the inventor. The permanent hard drive 57 can be any magnetic or other media storing internally the corresponding computer password image that will match and correspond to that on the removable media device disk 61.

In use, the computer program is installed initially on the computer on the permanent hard drive 57 and once installed, need not be used again so long as the program remains stored on the permanent hard drive. In the installation process, the program accesses the internal computer user definable startup programs and installs the necessary code to direct the user at startup to the security startup screen. In MS-DOS based PC's for example, the AUTOEXEC.BAT file and the CONFIG.SYS file might be used, although other methods of directing the user to the security login screen are envisioned. The object is to insert the proper code to draw up the program upon computer start before allowing any further access to the computer, and also prior to any log-in attempt if the computer is connected to a network. If the inventive process is utilized to prevent access to specific programs, or even the internet, the access modules of those programs are revised to insert the proper code to direct the user to the security login screen. In essence, the computer program or the device is comprised of four essential modules, an installation module utilized for installing the program initially, an

1 initialize/recognize module that is readily on call when the  
2 computer is turned on for signing on, a create/edit module that  
3 allows for creation or editing of image passwords and provides for  
4 calling up of standard paint or other graphic image programs, and  
5 a store/download module for storing the selected passwords in the  
6 respective computer/keypad permanent memory and also storing in the  
7 respective removable storage media drive. These modules are shown  
8 respectively in Figure 4.

9 To create or edit a graphic display, one simply calls up the  
10 respective module which then calls up the respective standard paint  
11 program or other scanner software if an image is intended to be  
12 scanned in as a password image. When the password image is  
13 finalized, the image is then downloaded utilizing the  
14 store/download module and the image is stored. In particular, an  
15 image can be the same image and same password image for both the  
16 computer and the keypad device or it can be two separate images.  
17 The desired password image is stored in the desired location in the  
18 keypad device non-volatile memory, and the computer password is  
19 stored in the computer hard drive or other permanent means. In the  
20 preferred mode, these stored images are stored in a non-typical  
21 format (other than bitmap, TIFF, etc.) so as to reduce the  
22 possibility of discovery by third parties. The images are  
23 ultimately compared, pixel for pixel.

24 The respective passwords are also stored on the respective  
25 floppy (keypad floppy and computer floppy). It should be kept in  
26 mind that any floppy as used herein refers to any removable storage  
27 medium device.

The user then removes the two floppies, or if desired, the same floppy can be used for both the keypad device and the computer.

However, in the preferred mode, it should be understood that each password consists of a series of images and the store/download module provides for creating a desired recall of the sequences of the images of that must be repeated upon sign in to successfully log on. It should also be understood that during the download process, each image is assigned to a separate key selected by the user on the respective keypad or keyboard. For example, a user wanting to use a photograph of their child and their pets, or a personal doodle or scribble will store them as separate images and assign them during the download process to their respective key on the keypad and this sequence must be remembered inasmuch as the keypad memory also recognizes the proper sequence. If the user selected keypad number 8 to represent the pet, keypad number 7 to represent the personal doodle and keypad number 2 to represent the scribble, the proper sign in sequence would then be 8, 7, 2.

When turning the computer on or signing in, the user is brought to the initialize/recognize module menu prompting the user to enter into the computer the respective proper code and sequence. The same process is used for the keypad wherein the keypad display prompts the user to insert the floppy "key" which contains the images, as does the floppy "key" for the computer, and the keypad prompts the user to insert the proper sequence on the keypad. If the proper password and sequence is provided, and after a pixel by pixel comparison, the keypad sends a Grant Access Signal (GAS) to

1       the computer via the standard USB (or other desired port),  
2       satisfying condition 1 for the computer to allow access to the  
3       user. Condition 2 is met if the proper image code and sequence is  
4       entered into the computer keyboard. It should be noted that either  
5       the keypad password device or the computer password device may be  
6       entered first, although in the preferred mode, the order of entry  
7       would be to enter the computer password first. It should also be  
8       noted that the computer password can be an alphanumeric password.  
9       Consequently the entire invention allows for a unique combination  
10      of image and alphanumeric passwords to be used at the user's  
11      discretion.

12       If the password in the keypad device is not valid, the  
13      following sequence occurs: the user is prompted by the keypad  
14      display if the login failed, and the count for maximum retries is  
15      incremented, a check for maximum login attempts is performed and if  
16      the total number of login tries for the current login session is  
17      less than or equal to the maximum login tries allowed, the user is  
18      prompted by the keypad display to retype the password, restarting  
19      the process. However, if the total number of login tries is more  
20      than the maximum number of login tries allowed, the user is denied  
21      access for a pre-designated period of time. This predesignated  
22      period of time is designated by the user in seconds, minutes, hours  
23      or other period, at the time of installation of the program, and  
24      this particular number resides in permanent memory on the keypad  
25      device.

26       The processor executes the program and directs the input and  
27      output that occurs with the input/output device, the media device,  
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1        keypad display and keypad interface, along with various keypad  
2        memories. After access has been granted, the keypad device can be  
3        powered down and unplugged.

4              The process described is as set forth in Figures 3 and 4.

5        In another mode of the invention, the keypad device operates  
6        alone and independently without the need for a computer password.  
7        However, in the preferred mode, the addition of the computer  
8        password process enhances the security of the program.

9              Consequently, what is disclosed is a method and apparatus for  
10       providing a highly secure process and environment for a computer  
11       in/or network and allows the user a much broader range of passwords  
12       in the form of user defined graphic images so as to allow far more  
13       creative passwords, reducing chances of unauthorized access, and  
14       further provides for all of the above utilizing commonly available  
15       graphic programs including paint and scanner programs.

16              While there have been shown and described particular embodiments  
17       of the invention, it will be obvious to those skilled in the art  
18       that changes and modifications may be made without departing  
19       from the invention or its equivalent, and, therefore, it is  
20       intended by the appended claims to cover all such changes and  
21       modifications as fall within the true spirit and scope of the  
22       invention.